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frond-gathering expedition it is necessary to go provided with a quantity of thick absorbent paper in large single sheets. The best for the purpose is botanical drying paper, of which there are several kinds manufactured. The object of its preparation is to exclude any chemical substances which may act injuriously on the coloring of the fronds. The supply of this paper to be taken on a collecting tour must depend on the number of fronds to be secured. It will be desirable, however, not to attempt to get too many at one time. Fifty single sheets, about eighteen inches long by twelve wide, will perhaps be as many as can be conveniently carried. The size mentioned is suggested as sufficiently large to include average-sized specimens. For the larger kinds a larger paper can be used, although for convenience in carrying and in arranging in the portfolio or herbarium it will be better to take portions only of large fronds. The sheets of botanical paper should all be cut to one size and secured between a couple of boards of the same size. Two strong leather buckle-straps to keep boards and paper compactly together will be necessary, and a third strap passed under the other two at the edges of the boards and buckled will answer the purpose of a handle by which to carry this temporary press and collecting case in one.

When the first frond is taken the boards must be opened and one of them laid flat on the ground and covered by a couple of sheets of the paper. On this the frond should be laid after being cut from the rootstock at the base of the stem. Upon it should be placed the remainder of the sheets, beginning at the apex of the frond, holding the superincumbent sheets in the left hand, the left wrist keeping them down, while the right hand—as the whole length of the sheet is being lowered—is employed, with the aid of a small stiff brush or pointed stick, in adjusting the frond in a manner to prevent any crumpling, doubling down, or bending under of the parts. As soon as the entire frond has been satisfactorily laid out, the second board should be put upon the pile and the straps secured, though not too tightly, in case there should have been any accidental doubling under. As other fronds are successively secured, the same process must be gone over again, care being taken in undoing the boards not to disturb the fronds already secured, and to allow at least two sheets of paper between specimens. When the collecting boards are full, the next proceeding is to arrange the fronds at home for the first stage of pressing. They should be carefully examined as they are taken from the case, in order to remedy any little disarrangement of their parts. This can easily be done while the latter are green and pliant, by the aid of the brush or pointed stick already mentioned. A small magnifying-glass held in the left hand will be found a useful aid in this work of properly arranging the fronds, especially of the smaller kinds of ferns, the disarrangement in the parts of which cannot sometimes be readily seen by the unaided eye.

A fresh set of drying sheets should now be used, the fronds laid carefully upon them—two or three sheets of paper between each—and the whole—enclosed in the boards—put under moderate pressure in a copying or other press, or in a press extemporized by using two smooth but thick and heavy boards and some heavy weights. At the end of a short period—say the next day—the fronds should again be removed, placed once more, after rectifying any accidental disarrangement of parts, between fresh sheets of paper—the old sheets as disused being dried for subsequent use—and put into the press for another day. This process should be repeated a few times until the fronds are thoroughly dry. The period will depend upon the kind of fronds, and their more or less succulent or herbaceous character. On a journey where a press cannot be easily extemporized, a substitute can be provided beforehand in the shape of a couple of very thick and heavy boards of oak or elm, with crosspieces, dovetailed at each end to keep them from warping, and very thick and strong leather buckle straps.

From the press the transfer to the portfolio is an easy process. And here arrangement must be left in a great measure to the taste of the collector. A few suggestions may, however, be of service. When ferns have two kinds of fronds—barren and fruitful—specimens of each should be obtained, and it is desirable to have two specimens of the fronds of every species, so that front and back may be shown side by side, the front being generally distinguished by greater depth and richness of coloring, while the back has its arrangement of spore-cases and their coverings. The order of arranging the fronds should be according to genera, and in a portfolio provided with guards, and containing stout sheets of white paper. The specimens should be lightly fastened to the paper by means of threads passing over and secured at the back of the sheet. In this way they may be preserved for years, and the collection will become doubly an object of interest if to each specimen is attached a label bearing not only its name, but the place where it was gathered, together with the date of gathering.

INSECT TAXIDERMY.

THE practice of taxidermy, as applied to the preparation and preservation of insects, is almost unknown in this country. Those who have convenient access to the cabinets of the American Museum of Natural History in Central Park, may see there some beautiful work of this kind. An old school-teacher of Stuttgart, in Germany, prepared a large series of insects for Professor Agassiz, after whose death the specimens were transferred to the American Museum. They consist of insects of various orders, each species being illustrated by a prepared specimen of the various phases in which it appears, from the egg to the perfect form. The plant on which the insect feeds is arranged with the specimens, together with the nest that each makes. The worms are emptied of their contents and preserved with much care, showing the various stages; many of them are of brilliant colors, and retain a very natural appearance. The cocoons and the silken or other products are also shown. In some instances spiders' nests prove to be made up of a tough and beautiful silk.

This new art, though in its infancy, is yet within the reach of many a young amateur, and it is beyond question that a tolerable exercise of ingenuity will produce such results as to claim unwonted interest, even from those scoffers who cry "bugs!" and "rocks!" much to the discomfiture of young naturalists. The principal manipulation is with the worms or larvæ. You wish to preserve, for example, one of the great green worms that you find eating your grape-vine. Make an incision across the posterior portion, just sufficient to include the end of the alimentary canal; press the contents of the worm out through this opening, gently, and with especial care in the case of the tussock-moth worms and others that have hairy or other appendages. Though seemingly a hazardous thing to do (as respects the integrity of the specimen), yet the most delicate hairy caterpillars may be very successfully emptied of their contents. Indeed, they are by this process so cleaned internally that, practically, they are *skinned*, and you have the skin now to deal with.

Select a good straw, of size proportioned to the specimen; this is to be used as a blow-pipe, and should, therefore, be a whole one, and several inches in length. Introduce the straw carefully within the cut end of the worm, and tie the end around the straw with fine silk. If the operation of squeezing has been successful, it remains to inflate the body for preservation. Prepare a dish of live embers, and over these hold the specimen—using great care in the degree of heat applied. While holding the worm in this way, keep it inflated. The form which the insect is to assume for the cabinet should be considered while this drying process is going on. Some light wooden frame, such as will be readily suggested to the operator, will often be of service to hold the specimen in the proper position. Some worms may require to be curved, or put into a shape characteristic of them while living—"surveyors," or "inch-worms," for example. Attention to these points will contribute greatly to the value and pleasing appearance of the specimen. The straw, after the drying, is cut off near the body, as it is convenient to allow a small portion to project outside, so that the specimen may be pinned to the cabinet through it, thus avoiding the injury that results from passing the pin through the body.

The specimen is now complete unless we choose to adopt some method of poisoning it. Corrosive sublimate, which is sometimes used, is likely to injure the colors. A strong arsenical solution may be applied with a brush, safely, as regards the colors. Caterpillars prepared in this manner preserve their color and form nearly perfect, the hairs and other appendages retaining a remarkably natural appearance, which, of course, enhances greatly the beauty and usefulness of an entomological cabinet.

An extended field is open to any who may practise this branch of taxidermy. Among the various objects that may be gathered by an insect collector some are of peculiar interest. The pine-borer (Rhagium lineatum) is found under the bark of white pine-trees, and specimens of its nests brought in from Central Park, and now exhibited in the cabinets of the American Museum of Natural History, show the most delicate structure. On the smooth, flat inner surface of the bark is a shallow channel, two or three inches long, cut as exactly as if with a chisel or carpenter's gouge. This leads to a circular excavation of the same shallowness, coiled around which is a collection of fibres of bark as carefully and exactly laid as the straws and horse-hairs in some exquisite bird's nest. In this hollow the larva lies after its labors, and undergoes the change from a wingless grub to a winged beetle or bug, all ready to flit around the pines and deposit its eggs.

The carpenter-bee (Xylocopa) is a remarkable insect builder, whose work is very beautiful, yet eminently practical. In the museum at Central Park is a piece of white pine-wood, about eight inches in length, bored crosswise sufficiently to admit the bee, which is about the size of the ordinary humble-bee. A channel follows at right angles to this entrance passage, and on a line with the fibres of the wood. This channel is so handsomely cut that it has the appearance of having been made with a carpenter's auger, but it is genuine insect work, recalling to mind Mercutio's

> "Joiner squirrel, or old grub,
> Time out of mind the fairy's coach-maker."

The channel is about twelve inches in length. Imagine all this bitten out by the not particularly hard jaws of the carpenter bee! Like the joiner, the bee leaves a pile of chips or sawdust. This dust is utilized, being moistened with a gluey substance secreted by the bee; and, when one egg, with its complement of pollen or honey for the forthcoming young grub, is deposited, a thin but substantial partition is constructed of this gluey mixture, completely shutting in the cavity from the air. The tunnel is divided in this manner into ten or twelve apartments, in each of which a single egg is deposited. The length of time required to finish this work may be imagined. One naturally wonders how it will be with the first grub, seeing that it must necessarily come to active life somewhat sooner than the remainder. How does it escape? The mother-bee unerringly provides the means by boring a side passage through which No. 1, when it has burst from the egg and eaten its supply of honey, emerges from the cell, its newly-grown mandibles serving to gnaw through the barrier of dust and glue which the mother has erected. Nos. 2 to 12 inclusive come forth, each in turn, through the same passage—the last traversing the whole gallery ere it reaches the outlet or back-door.

J. B. HOLDER.

A RECENT improved receipt for preserving plants with their natural colors is to dissolve 1 part of salicylic acid in 600 parts of alcohol, heat the solution up to boiling-point in an evaporating vessel, and draw the plants slowly through it. Shake them to get rid of any superfluous moisture, and then dry between sheets of blotting-paper, under pressure in the ordinary manner. Too prolonged immersion discolors violet flowers, and in all cases the blotting-paper must be frequently renewed. The novelty appears to be the salicylic acid.

IMITATION pearls, diamonds, and precious stones are being manufactured in Paris to a considerable extent, and these productions are sent to the shops of all lands. Hundreds of operatives are employed in polishing the colored stones and in lining the false pearls with fish scales and wax. The scales of the roach and dace are chiefly employed for the latter purpose. They have to be stripped from the flesh while living, or the glistening hue so much admired in the real pearl will not be imitated.

AN "aquarium" has been exhibited at Munich, which has been manufactured by command of the German Emperor, and is intended for the first prize at the approaching fishery exhibition at Berlin. It consists of a large glass sphere supported by three naiads. The space between the figures is filled with flowers. The stand on which the whole rests is of hammered ironwork. Dolphins and sea-plants wrought in copper are intertwined in the work, which was designed by Professor von Miller, and is pronounced to be a beautiful piece of art.